Friday, September 17, 2021

DOH Agenda Items – Groundwater Flow Modeling Working Group Meeting (GWFMWG)

<u>SUGGESTION: PART I, COMMENTS ON CSM WITH FOCUS ON DISOLVED PHASE TRANSPORT</u>

I.   Overview of DOH Critique and Non-Acceptance of Navy GWFMs – 15 min

a.   Key AOC Objective: Refine prior modeling to better reflect Red Hill area groundwater behavior and, implicitly, the underlying hydrogeologic system

b.   Models do not adequately represent area data

       i.   Gradients and transient g.w. elevations not adequately represented

      ii.   Geologic complexity and appropriate scale are not incorporated or investigated

     iii.   Parameter ranges outside norms and inadequately justified

     iv.   Modeled groundwater paths are inconsistent with geochemistry

II.   Overview DOH Issues with the Navy CSM – 15 min

a.   The agency Top Ten was an example list of CSM features that do not comport with available data and Hawaiian groundwater experience

       i.   Most of these aspects remain unaddressed in the Navy CSM

      ii.   Key issue: the CSM is neither conservative nor reliable to form the basis for the GWFMs, CF&T and fuel transport evaluations

b.   Insufficient spatial monitoring density to support many of the conclusions and inferences of the Navy CSM

c.   Geologic structures not appropriately reflected in modeled elements

       i.   Potential fast track pathways have not been fully considered: lava tubes partially considered, but no buildout of 3-D geologic model

      ii.   Other void features & connectivity unexamined and unknown

     iii.   Saprolite extent – there seems to be some Navy interpretations that may influence flow responses, needs further validation through the geologic model. Associated are the valley fill/alluvium contacts.

         1.   Modeled saprolite is deeper up valley and shallower down valley than the physical data indicates. Brings into questions the models conclusion about the hydraulic relationship between the groundwater beneath the facility and the Halawa Shaft.

     iv.   Hydraulically conductive formations dipping below alluvium/saprolite wedges conflict with known structural relationships

d.   Groundwater flow/gradient directions.

       i.   Neither modeled drawdown nor gradient responses are consistent with detailed field measurements

      ii.   Site drawdown data, during RH Shaft pumping, doesn't demonstrate the capture shown in the GWFMs.

     iii.   Detailed measurements of natural chemical and isotopic tracers directly conflict with CSM flow directions

     iv.   Natural tracers show that flow paths and source waters that are more complex than accounted for in the Navy GWFMs and CSM.

LEAD INTO MATT'S PRSENTATION

PART II: BRIEFLY TOUCH ON ADDITIONAL CSM CONCERNS RELATED VADOSE ZONE AND LNAPL TRANSPORT. INTENT IS NOT TO FOCUS FOR TODAY'S DISCUSSION, BUT REMIND EVERYONE THAT THESE ARE CONCERNS STILL NEED TO BE ADDRESSED TO OUR SATISFACTION, AND REMAINS AN IMPORTANT PART OF CFT AND RELEASE RESPONSE.

e.   Fuel loading and transport questions
       i.   Current distribution of in-place fuel mass is unknown
      ii.   LNAPL retention characteristic in the vadose zone are unknown
           1.   Petrophysical lab data have been demonstrated non-representative
           2.   Holding model is hypothesis-based, and when tested, not supported by bench testing.
           3.   Navy petrophysical testing is flawed, as noted Feb 2018
     iii.   Thermal NSZD interpretations conflict with actual data
           1.   EG, RHMW01R & RHMW03
           2.   Attenuation rates do not appear supported by data
           3.   Nor the conclusion that LNAPL is fully degraded
     iv.   LNAPL has potentially impacted groundwater
           1.   Based on DOH review of data trends
           2.   And past observations of fuel blebs in bailer sampling
      v.   Distal well detections are likely real based on multiple lines of evidence
           1.   DOH does not concur with Navy evaluations
           2.   Little naturally occurring TPH range hydrocarbons in pristine basalt aquifers
     vi.   Geometry of various release scenarios is unknown
           1.   Other literature examples indicate that fuel will migrate quickly and often in unanticipated directions (often fractal distributions)